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ABSTRACT

The importance of reassessing the psychometric properties of an existing scale is highlighted. The construct validity of a driver attitude scale was not confirmed by factor analysis and the original scale scores were shown to have poor to moderate internal reliability. On the basis of a re-analysis of data from 1,059 repeat traffic offenders, 39 of the original 47 profile items were retained to form a total score. The computation of a total profile score for these items resulted in marked improvement of the profile's internal reliability (alpha=.89). Total scores were significantly different based on sex ($p<.01$), age, and education level of these drivers ($p<.001$). Total profile scores were significantly related to past accident and violation experience, with negative attitudes increasing as the number of self-reported incidents decreased ($p<.001$). Instructional and evaluation implications are discussed. (Contains 1 table and 12 references.) (Author/SLD)

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Evaluating the Utility of a Self-Assessment Profile for Use with Problem Driver Populations

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The importance of reassessing the psychometric properties of an existing scale is highlighted. The construct validity of a driver attitude scale was not confirmed by factor analysis and the original scale scores were shown to have poor to moderate internal reliability. On the basis of a re-analysis of data from 1,059 repeat traffic offenders, 39 out of the original 47 profile items were retained to form a total score. The computation of a total profile score for these items resulted in marked improvement of the profile's internal reliability (alpha = .89). Total scores were significantly different based on sex ($p < .01$), age, and education level of these drivers ($p < .001$). As important, total profile scores were significantly related to past accident and violation experience, with negative attitudes increasing as the number of self-reported incidents increased ($p < .001$). Instructional and evaluation implications are discussed.

Motor vehicle crashes remain the leading cause of unintentional-injury deaths, at an estimated cost of over $200 billion in the United States for 1997 alone (National Safety Council, 1998). Past research has shown that motor-vehicle crashes are not randomly distributed among drivers. More specifically, the results of recent studies in the United States have demonstrated that drivers who are involved in traffic violations or accidents are at increased risk of being involved in subsequent automobile crashes (Gebers & Peck, 1987; Peck & Kaun, 1983; Lui & Pollock, 1991). Although this relationship holds for some drivers, it is clear that many drivers with prior traffic accident or violation experience are never involved in subsequent crashes. Despite the fact that past research has not provided a complete profile of all driver characteristics related to traffic accident and violation experience, there is evidence of a link with past traffic-related experience as well as aggression and risk-taking behaviors on the roadway (Jonah, 1986; Hodgson, Bragg & Finn, 1981; Lehto, James & Foley, 1994). An intervention program designed by the National Safety Council has focused on correcting driving patterns of recurrent traffic offenders through behavioral change with the intended outcome of mitigating future traffic infraction involvement by these drivers.

Overview of Program

The National Safety Council's Defensive Driving Course Attitudinal Dynamics of Driving (ADD) program is an instructional intervention course taught in a 6 or 8-hour format by certified instructors. It is designed for drivers whose licenses have been suspended or revoked, or for drivers deemed as repeat traffic offenders, non-alcohol related. In general, participants have been defined as drivers who have been referred by the court system, referred by their employers, been involved in a collision, have a point-

suspended license, a revoked license, or an excessive number of, or points accrued from, moving violations (National Safety Council, 1996).

The underlying principles of the course are based on choice theory, which suggests that human behavior is purposeful, that is, it originates from the individual rather than external forces (Glaser, 1998). During the course, participants are asked to identify problem driving behaviors, choose more need fulfilling, positive behaviors, and on this basis create an action plan to change, identified, unwanted traffic-related behaviors. The intent is to actively involve participants in evaluating their driving habits and to facilitate decisions and choices about their driving behaviors in a positive and responsible manner. These participant-related goals are designed to be accomplished using a variety of instructional strategies (National Safety Council, 1996).

An integral part of the ADD program's self-help curriculum, is a self-assessment profile that participants are asked to complete. This profile consists of attitude statements directed toward evaluating personal driving behaviors. Per instructions provided by the National Safety Council (1996), scale scores are created based on driver trait characteristics. These scores are then used by participants along with other instructional strategies to help direct self-generated action driving plans. Despite the instructional usefulness of this self-assessment profile, its psychometric properties have, to date, not been investigated in the published literature. Thus, the intent of this study is to assess the internal reliability and construct validity of this self-assessment profile.

Method

Participants

The study sample is based on a total of 1,059 participants who had completed the National Safety Council's ADD program from January through June 1998. Of these, a total of 788 (or 74%) were men and 246 (23%) were women. The majority of participants were under the age of 30 (607 or 58%). Most often, participants had some college education (322 or 30%) or had completed high school (264 or 25%). Most participants reported that they drove almost every day (876 or 83%), estimating their driving to be less than 20,000 miles annually (421 or 38%).

Self-Assessment Profile

As previously stated, as part of the ADD program's self-help curriculum, participants were asked to complete a self-assessment profile. This profile consisted of 47 attitude statements directed toward evaluating personal driving behaviors. These statements were presented in two parts. Part A consisted of 25 statements that are evaluated by participants based on a 4-point, strongly agree to strongly disagree, Likert-type scale (Likert, 1932). Examples of these statements include: *Sometimes I drive just for the fun of it.* and *I get irritated when waiting at a four-way traffic signal.* Part B consisted of 22 statements that are rated using a 3-point scale (3 = *"A lot like me,"* 2 = *"Somewhat like me,"* and 1 = *"Not like me"*). Examples from this section include: *I increase the*

challenge and fun of driving by taking chances. and *I speed up to avoid getting caught at a light that has been green for quite some time.*

Demographic information on the participant's gender, age, and level of education was also requested. In addition, a series of questions addressed driving history, such as: the number of years the individual had been driving estimated number of miles driven each year, and the frequency of driving (e.g., daily, once a week). Participants were asked also to report the number of traffic violations and/or accidents he or she had accumulated in the past 12 months.

Data Analysis

All of the highlighted data analyses are based on data obtained from the self-assessment profile just described. The data analysis conducted for this study occurred in two phases. For the first phase, profile scores were computed for five driving traits as per instructions provided by the National Safety Council (1996). Based on these instructions, these scales are labeled as Power Competitive, Power Assertive, Belonging, Freedom, and Fun. Each of these scales is comprised of 12 items (6 items on a 4-point scale and 6 items rated on a 3-point scale, with some items included on more than one scale). Thus, the higher the score, the more the driver has a tendency to exhibit behaviors characteristic of that trait with a minimum score of 12 to a maximum value of 42. To confirm this structure, the construct validity of these scales was explored via factor analysis (i.e., principal components and varimax rotation). The internal reliability of these five scales was computed using Cronbach's alpha (Cronbach, 1951).

The results of the first phase of this analysis led to a re-analysis of these data in large part because the construct structure and internal reliability of the profile was not supported (phase two). To begin, responses to these statements were recoded such that a negative response (i.e., agreement or a "like me" response to a negatively worded statement or disagreement or an "unlike me" response to a positively worded statement) was rated at the high end of the scale. Total scale scores could range from a low of 47 to a high of 166 with the higher the total score, the more negative the driving attitude or described driving behavior. Item-total correlations were then compared. The internal reliability of the scale was re-evaluated and the construct structure re-assessed. Analysis of Variance (ANOVA) was used to assess total profile scores based on gender, age, and educational level. A general linear model was used to compare total profile scores with self-reported violation experience, and accident involvement. All analyses were conducted on an IBM-compatible personal computer, using SPSS (SPSS, 1999).

Results

Participants

Mean profile scores were calculated, based on all participants, for each of the five driver traits: Power Competitive, Power Assertive, Belonging, Freedom, and Fun as follows: 19.90 (4.34), 30.66 (3.50), 30.93 (3.93), 26.67 (4.63), and 27.58 (4.82). The

number of traffic violations for all participating drivers in the past 12 months ranged from none to six or more; 409 (39%) participants had one violation, 212 (20%) had two, and 234 (22%) had three violations or more during this time period. The number of accidents, during this same period, ranged from none to four or more; 231 (22%) participants had one accident, and 117 (11%) had two accidents or more.

Phase One

Based on principal components analysis, 12 factors were extracted that had eigenvalues greater than one. To test the five-trait structure of the profile, the first five factors were retained and rotated by varimax. These five factors each had eigenvalues of 8.73, 3.06, 1.90, 1.65, and 1.41 respectively which together explained 36% of the common variance. The rotated components matrix approached a simple solution but in general items did not load on the factor that the established structure would suggest (factor structure not shown). For example, the original Power Competitive items were divided among three factors (i.e., factors 1, 2, and 5) with the last factor comprised of only original Power Competitive items. The first and second factors had a mixture of items from across all five traits. Only the Belonging trait scale emerged relatively intact with 10 out of the original 12 items included on factor 3. Factor 4 combined select items originally from the Freedom and Fun trait scales.

A check on the internal reliability of the original trait scales also lent weak support for their use. More specifically, the alpha coefficients were as follows: Power Competitive (.76), Power Assertive (.50), Belonging (.66), Freedom (.71), and Fun (.75). The nature of these findings suggested the need for a re-analysis of these data, the results of which are described below.

Phase Two

Based on a total profile score (the higher the score, the more negative the driving attitude or behavior), item-to-total correlations suggested the elimination of eight items. *I worry that my driving will upset other drivers. The driver must handle every traffic situation. I feel at ease when I drive at the same speed as the cars around me. When it comes to driving, it's every one for oneself. The freedom that driving gives is important to me. Speed limits are guidelines rather than strict laws that must be obeyed. I avoid driving in another driver's blind spot on multilane highways. I readily acknowledge any courtesy shown to me by another driver.* The exclusion of these eight items resulted in a total profile score based on 39 items; with a mean score of 76.24 (12.59). The internal reliability of the total profile score was markedly improved with an alpha = .89. The revised factor structure, however, still failed to reveal a five-factor solution suggested by the driver traits previously discussed (factor structure not shown).

Support for using a total profile score as an interim index for instructional and evaluation purposes was further suggested by differences found in mean profile scores based on select demographic variables and past traffic violation and accident experience (see Table 1). More specifically, profile scores, on average, were statistically higher for

Table 1

Comparison of Profile Scores for Select Demographic Variables and Past Traffic Violation and Accident Experience

Demographic/Violation Accident Experience	N	Mean	SD
Gender[a]			
Males	655	76.98	12.80
Females	209	74.37	11.82
Age Categories[b]			
Under 20	151	83.01	12.33
20 to 24	195	79.00	12.41
25 to 29	177	76.18	11.32
30 to 34	138	75.32	12.01
35 and older	203	69.69	11.18
Educational Level[c]			
Some high school	140	79.30	12.17
HS graduate	220	75.52	11.15
Some college	269	77.53	12.28
College graduate or more	203	74.36	13.84
Number of Violations[d]			
Zero	145	71.81	10.70
One	340	75.14	11.90
Two	177	76.81	12.54
Three or more	197	81.32	13.59
Number of Accidents[e]			
Zero	566	74.80	11.81
One	187	77.38	12.42
Two or more	106	84.12	14.27

[a] $F_{(1, 862)} = 6.83,\ p < .01$
[b] $F_{(4, 859)} = 30.73, p < .001$
[c] $F_{(3, 828)} = 5.47,\ p < .001$
[d] $F_{(3, 855)} = 18.62, p < .001$
[e] $F_{(2, 856)} = 27.80, p < .001$

male as compared to female drivers ($p < .01$). Mean profile scores were also related to driver age, with higher scores associated with younger drivers and mean profile scores decreasing as the age of the driver increased ($p < .001$). Profile scores were also related to education level with mean profile scores again decreasing as the level of education increased ($p < .001$). As important, profile scores were significantly related to past traffic violation experience with profile scores increasing as the number of self-reported violations increased ($p < .001$). A similar statistical relationship held for past accident experience, that is, mean profile scores tended to increase as the number of self-reported accidents increased ($p < .001$).

Discussion

The results of this study highlight the importance of psychometrically evaluating an instrument that is used for instructional as well as evaluation purposes. In general, the five driver trait structure of the self-assessment profile that is an integral part of the National Safety Council's Defensive Driving Attitudinal Dynamics of Driving program was not supported by the present research. A total score based on a slightly shorter profile comprised of 39 items was shown to have improved internal reliability. Despite a clear delineation of the underlying constructs of this total profile score, this instrument was shown to be able to differentiate scores by demographic variables such as gender, age, and educational level and importantly, was significantly associated with past violation and accident experience.

Further research efforts may need to investigate whether the five-trait driver model of Power Competitive, Power Assertive, Belonging, Freedom and Fun are sufficiently critical constructs to warrant the redesign of this self-assessment profile or if similarly useful constructs can be developed based on the factor structures suggested by these analyses.

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